MEASURING EGOVERNMENT PORTAL MANAGEMENT ON THE LOCAL LEVEL: RESULTS FROM A SURVEY OF PUBLIC ADMINISTRATION OFFICIALS

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ABSTRACT

Given the importance of eGovernment portals as an integral access interface of modern public service provision, this contribution concentrates on the issue of the dimensions and derived success factors of these information systems. Starting with the DeLone & McLean IS success model and the resource-based view as foundations, this article conceptualizes the important success factors of eGovernment portals and then integrates these into a research model. The empirical results show the importance of the different dimensions of eGovernment Portal Management as well as the development of eGovernment portals so far. For public service portals on the local level the key management dimensions are information, system, service and privacy management. The evaluation of these dimensions as well as perceived internal and external success in public administration institutions complement user-based quality assessments and highlight organizational strengths and weaknesses.

Keywords *- DeLone & McLean IS Success Model, eGovernment Portal, Resource-Based View, Structural Equation Modelling, Success Factors*

INTRODUCTION

eGovernment applications are a vital interface between citizens and government (Thomas and Streib, 2003; Charalabidis et al., 2006). They have the potential to transform public service provision, to enhance the image of the public sector, to strengthen trust in government or administration (Cf. Metaxiotis and Psarras, 2004; Parent et al., 2005; Scholl, 2005b; Welch et al., 2005) and possess special relevance for advancing the field of public service through citizen participation (Holzer et al., 2004, p. 7). The expected eGovernment service potential and its related impacts on existing political processes, as well as the advancements in information and communication technologies, have improved research endeavours over the last few decades (Agranoff and McGuire, 2001; Seel and Thomas, 2007, 23; Welch, et al. 2005, 371; Chen, et al. 2006; Yang and Rho, 2007, 1197; Dawes, 2009). But most research has concentrated on end-user per-

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ceptions and characteristics, technology-related factors regarding government websites design, information access and quality and services offerings (Detlor et al., 2010), lacking an adequate consideration of internal public management success factors of eGovernment portals from a provider-perspective, as pursued in this study.

eGovernment portals

For this purpose, we start off with the following eGovernment definition of Grant and Chau (2006) which states that eGovernment refers to facilitating the processes of public will formation, decision-making and service provision in politics, government and administration using information and communication technology, especially the Internet, capable of increasing efficiency and effectiveness (Grant and Chau, 2006, p. 74). The focus of this eGovernment study is on eGovernment portals, which are defined as "multi-functional information systems which provide a single point of access to relevant information and services via the Web-enabled interface" (eDevelopment, 2012). In other words, eGovernment portals are bundled and integrated communication systems that allow access to information, processes or applications that are located on different systems within the public administration but which are accessible to the public on one dedicated city website. These eGovernment solutions are particularly appropriate and important at the local level because municipalities encapsulate most of the procedures and decision-making authority of the state sector in themselves as well as provide the technological infrastructure for networked relationships of governance (Lim and Tang, 2006, p. 110). In addition, eGovernment portals at the local level provide a central point of contact for all citizens (Welch et al., 2005, p. 375). Today, local eGovernment claims to be, in some cases, already quite user-oriented and interactive; however, uneven diffusion of actual and planned systems and basic services characterizes the status quo in local eGovernment (Jun and Weare, 2011, p. 497).

Research gap

The described situation fosters the importance of eGovernment portal management on the local level since eGovernment may substantially improve public service provision and strengthen public administration reputation (Cf. Holzer et al., 2004, p. 7; Metaxiotis and Psarras, 2004; Parent et al., 2005; Scholl, 2005b; Welch et al., 2005). Moreover, eGovernment portals fundamentally influence citizen-government-interaction (Thomas and Streib 2003; Charalabidis et al. 2006). This matter gains special importance on a local level since here, eGovernment is still in an emerging stage and has yet to achieve its full potential (Coursey and Norris, 2008; Capgemini et al., 2009). Aggravating this situation, the main factors that determine the success of local eGovernment portals from the perspective of the institutions providing the services are not yet fully understood (Hung, Chang, and Yu, 2006, 100; Coursey and Norris, 2008) and little knowledge on what public managers need to undertake in order to further exploit eGovernment potential is available (Boynton et al., 1994; Zahra and George, 2002; Arduini 2011). What makes things worse is that the technology and its technical implementation itself may only show little complexity, while organizational, legal, political and social aspects provide the bigger challenge (Scholl, 2005a), further increasing the pressure on public managers. From an investigative perspective, provider-based success models in particu-

lar are insufficiently taken into account. In most quantitative multivariate contributions, the perceptions of users are the sole basis of measurement. But internal public administration factors cannot be addressed by user-centric studies. Furthermore, concerning the few confirmatory multivariate provider-based studies, most of them focus on specialized topics, like tax filing, where the attitudes of administrative staff are analyzed using models of user perception (Floropoulos et al., 2010; Mohamed et al., 2009) or internal communication barriers (Sanchez et al., 2003). Therefore, the success dimensions of eGovernment systems from the provider-perspective require further investigation (Ebrahim and Irani, 2005) and a great need for future eGovernment research prevails (Dawes, 2008), especially regarding the key informant approach moving from a user-centric to a provider-centric perspective. This is also in line with Rana et al. (2011), who state that sophisticated attitudinal multivariate studies, which address success factors of eGovernment usage, mainly focus on established models of information system research to explain citizens' eGovernment usage behavior and Morgeson et al. (2011) claiming a lack of theory-based research and use of rigorous statistical procedures in the field of eGovernment. Additional support is provided by Jaeger (2003), Chatfield and Alhujran (2007) as well as Jiang (2011) who remark that - despite their vital importance - eGovernment portals remain under-investigated. Apart from that, the scientific environment mentions a shortfall on confirmatory empirical studies since "[…] a recent review of the e-government literature found a general lack of statistical or empirical rigor and of formal testing of theory or robust model building" (Morgeson et al., 2011). Thus, a research gap concerning quantitative confirmatory approaches with theory building or confirming character prevails, too. Against this background, we apply a multi-theoretical confirmatory empirical research approach. Given the scientific and practical relevance of eGovernment portals on a local level, this assists from a scientific and public management perspective by empirically contributing to the conceptualization of eGovernment portal management. Furthermore, we directly address the problem of a persisting lack of theoretical and practical knowledge on internal public management success factors of local eGovernment portals from a provider-perspective as well as the shortfall on confirmatory multivariate empirical studies by applying structural equation modeling. In this way, we intend to complement theoretic and empirical knowledge on the factors contributing to the success of eGovernment portals and derive real-life implications through empirically confirming the developed theory as well as relevant management factors inside public administration organizations that drive eGovernment portal success.

Research objectives and proceedings of the study

The design of successful management routines and action parameters on an organizational level is a phenomenon that should be evaluated using key informants in the organization. In this way a differentiated concept of success can be applied, which is not merely limited to individual success measures like acceptance or usage intention. Instead, organizational success dimensions like effectiveness and efficiency of internal processes are in focus. These provide a broadening perspective of potentially problematic aspects of current eGovernment systems and cannot be directly measured by user surveys.

The main factors that determine the success of local eGovernment portals from the perspective of the institutions providing the services are not yet fully understood. Therefore, this article has two major goals. First, it seeks to develop a conceptual model for the identification of the factors influencing the success of local eGovernment portals from a provider-perspective and to analyse the causal relationship between the identified factors and the success of the eGovernment portal. Therefore, this study aims to answer the following core research question: What are the management factors inside public administration organizations that drive eGovernment portal success?

Following from this, the second goal of this article is to add to the empirical knowledge on the factors contributing to the success of eGovernment portals from a provider-perspective. Generally, studies on eGovernment portal success that examine complex relationships tend to come from research showing a user-perspective. While there are a few good examples of qualitative provider-based research, which is highlighted in the following chapter, this study uses the quantitative approach of structural equation modelling in order to evaluate whether the proposed theory is supported by the study sample.

For this purpose, the article is structured as follows: First, we summarize previous research on the success factors behind eGovernment portals. Next, the explanation of the theoretical framework used for conceptualization of the research model follows. Subsequently, the data and indicators as well as the employed method are explained before reviewing the empirical results. Last, the outcomes are discussed and clear implications as well as conclusions drawn.

LITERATURE REVIEW

Research investigating the relationships between government, society and technology has soared over the last decades (Dawes, 2009). To a large degree, this can be attributed to the development of information and communication technologies, which has radically transformed the way individuals, organizations, and governments used to work and communicate (Alawneh et al., 2013). The rapid evolution from rudimentary use of information and communication technology to administering complex processes and establishing reliable and powerful tools and networks has changed the way governmental services and processes are carried out (Clift, 2003; Chen et al., 2006; Dawes, 2008). In this context, Karunasena and Deng (2012) argue that "[g]overnments around the world continuously use e-government for transforming their public service delivery, promoting greater interaction between their citizens and government, streamlining the two-way communication between citizens and governments, improving the efficiency of public organizations, and saving taxpayer money […]". Thus, eGovernment services and systems have become an important agenda for all kinds of governmental organizations. A cornerstone of this development is the desired cost reduction potential for the respective organizations and institutions (Bertot et al., 2008). Even though there are good-practice examples for cost reduction initiatives (Yang and Rho, 2007; Coursey and Norris, 2008), counteracting factors, such as investment costs, rigid staffing plans, inadequate

learning curve effects, complex administrative processes and parallel offline service offerings (Miyata, 2011) as well as difficulties to quantify achieved benefits (Gupta and Jana, 2003), are regularly identified. However, the expected value-add and the practical implementation hindrances has led to increasing research interest (Warkentin et al., 2002; Marche and McNiven, 2003).

So far, research on eGovernment has taken many directions. From an addressee and technology deployment perspective eGovernment topics have been investigated regarding private organizations, public authorities and the general public (Cf. Moon, 2002; Wang, 2003; Chu et al., 2004; Moon and Norris, 2005; Huang, 2006). From a content point of view, much research effort has been put on the following eGovernment topics: information system and technology related (e.g. Wang, 2003; Fu et al., 2004; Carter and Bélanger, 2005; Hu et al., 2009; Bertot et al., 2010; Jaeger and Bertot, 2010), citizen satisfaction and trust (e.g. Parent et al., 2005; Chan et al., 2010), success factors and barriers (e.g. Dawes, 2002; Gilbert et al., 2004; Angelopoulos et al., 2010; Janssen et al., 2012), perceived impact (e.g. Norris and Moon, 2005) and benchmarking (Cf. Benbasat et al., 2007).

Apart from that, the main focus of eGovernment has been user- or citizen centric dealing with diverse topics, such as cost savings, portal design, benefits, barriers, etc., directly concerning the user (e.g. Dawes, 2002; Reddick, 2005; Charalabisdis et al., 2006; Chatfield and AlHujran, 2007; Bertot et al., 2008; Bertot et al., 2010; Luna-Reyes and Gil-García, 2011; Janssen et al., 2012). Regarding user-centric research, a substantial part of the investigations adopts the technology acceptance model (Davis, 1989) to measure the influence of individuals' intentions and behaviors (e.g. Warkentin et al., 2002; Gilbert et al., 2004; Bélanger and Carter, 2005; Phang et al., 2005; Hung et al., 2006; Conklin, 2007; Gefen et al., 2007; Lin et al., 2011). Although eGovernment research in general offers a veritable cornucopia of subjects and findings, investigations centering public administration officials dealing with eGovernment are generally sparse. In this context, we would like to mention Gil-Garcia (2006), who applied a mixed-method research approach to empirically explore the relationships between relative success of US government websites and certain organizational and institutional factors. He derived several success factors that may be summarized as follows: qualified IT staff, adequate budget, specialized training of responsible officers, in-house development and marketing measures. Apart from that, Detlor et al. (2010) studied six municipal portals in Canada applying an empirical research approach focusing on developing and implementing usable and functional government websites. Their recommendations are along the same lines claiming a skilled and adequately sized IT workforce, clear strategic vision and direction for the government website, sound website governance and leadership structures and to incorporate the needs of end-users and partners, to have efficient back-office processes in place, to provide sustainable funding and to run marketing campaigns to create end-user awareness. Zorlu (2011) empirically benchmarked eGovernment performances of Turkish public institutions and organizations to determine the effects of a strategic learning system and organizational structure on such a performance. Dawes and Pardo (2002) applied an exploratory case study approach investigating 18 collaborative digital government initiatives. Their findings offer a list of success

factors that should be considered to increase collaborative systems success: purpose, stakeholders, partnership, leadership, managing complexity, skills, resources, communication, work processes, and explicit design methods. But the main considerations should be put on accounting for the needs and capabilities of all stakeholders, understanding the details of all work environments and managing the relationship complexity that commonly underlie collaborative systems. Another thematically related exploratory approach to our study was taken by Gil-García and Pardo (2005), who present an analysis of resources that government practitioners use to guide their e-government efforts (e.g. risk identification, understanding the information and data challenges, setting up a business case and using contingency thinking in project planning and management). In this regard, the empirical study of Nfuka and Rusu (2011), which refers to internal efficiency and effectiveness, is also a good example. They say that although benchmarking studies are usually routinely conducted from public management, these are generally limited to simple descriptive measurement indicators and do not directly show a local level focus. Luna-Reyes and Gil-García (2011), who used semi-structured interviews of project leaders and participants of more than 15 digital government initiatives in Mexico, propose the use of institutional theory and dynamic simulation as an integrated and comprehensive approach to understand practical eGovernment phenomena. Finally, we found five other research studies that focus on a provider perspective (e.g. Song et al., 2004; Elizabeth and Ward, 2006; Angelopoulos, 2010; Cordella and Iannacci, 2010; Luna et al., 2013) but mainly deal with website design and implementation or eGovernment assessment and framework in general. Summing up, even though there are related provider-oriented studies available, a shortfall on confirmatory multivariate empirical studies that shed light on the management factors inside public administration organizations that drive eGovernment portal success is present.

THEORETICAL FRAMEWORK

Although research on interactions between stakeholders and public administration via electronic information and communication technologies is in its early stages (Wirtz et al., 2012), there exist proper theories for measuring success factors. For this study, the DeLone and McLean IS success model as well as the resource-based view are regarded as appropriate underlying theories.

The information systems success model of DeLone and McLean is a framework for measuring the complex dependent variable in information systems research. The model contains three determinants: information quality refers to the content of the system; system quality refers to the technical characteristics of the system and service quality refers to the IT-support based offers to facilitate use of the system (DeLone and McLean, 1992). These three variables reflect the relevant resources for the successful implementation and maintenance of an information system. In the context of public administration, information quality refers to citizen-centric and service-oriented content offers that facilitates and supports government in citizen interactions. System quality in the context of electronic public service offerings is related to technology-induced trust and it therefore constitutes a necessity for all transactional offerings (Teo et al., 2008). Service

quality is primarily oriented towards technical support offers that enhance usability and ease of use of public service offerings like a navigation structure on a portal website that is based on citizen needs rather than the organisational structure of the service provider. This factor includes qualitative aspects regarding user support in the use of the information system (Tan et al., 2008). These aspects include compassion and encouragement for the user during use. Within the overall IS model structure, the variables information quality, system quality and service quality have a direct influence on the individual impact variables intention to use and user satisfaction. Both variables in turn ultimately determine perceived net benefits, which is the sum of positive and negative organizational impacts of system use (DeLone and McLean, 1992). Due to its clearly structured specification of the basic hypotheses within the framework of success factor research and its applicability to different areas, this theory provides a firm foundation for conceptualizing and operationalizing eGovernment portal success factors and the dimensions of eGovernment portal management that lie behind that success. Thus, in the literature, the model is seen as an important instrument for explaining the success of information systems (Petter et al., 2008, p. 236). Since we focus on the evaluation and measurement of local eGovernment portals, the DeLone and McLean IS success model thus shows to be a perfect match for the research and presents the main theoretical basis of this study.

The second relevant theoretical foundation for this study is the resource-based view, which is an established economic theory that explains organizational success through specific input factors (Ireland et al., 2002, p. 427). It belongs to the most influential management theories and aspires to explain how the internal resources of an organization can be of a tangible or intangible nature, how their core characteristic is detecting and responding to market opportunities or threats (Ireland et al., 2002) and how they bring sustained competitive advantage. In order to achieve this, the organization needs to possess and control valuable, rare, inimitable and non-substitutable resources and capabilities (Cf. Barney, 1991; Barney, 1994; Eisenhardt and Martin, 2000; Kraaijenbring et al., 2010). The resource-based view can be considered an essential paradigm in management science (Priem and Buttler, 2001; Kraaijenbring et al. 2010), which is regularly applied in empirical research to investigate organizational success (Priem and Buttler, 2001; Ireland et al., 2002). In this context, the resource-based view's focus on resources and capabilities of an organization - being the primary constants for establishing sustained competitive advantage (Grant, 1991) - provides considerable explanatory power for organizational success. Dealing with internal resources related success factors, we thus applied the basic assumptions of the underlying theories in order to adapt the conceptualization and operationalization from a user-based to a provider-based perspective. For this purpose, the wording of resource-based scales was used to match the relevant management dimensions of public administration (Cf. Acedo et al., 2006). Therefore, attitudes regarding the relevant resources in terms of information, system, service and privacy management are applied.

Since the DeLone and McLean IS success model and the resource-based view are based on similar assumptions and conditions, they complement each other well and can be merged into an empirically meaningful explanatory model. This has often been shown in other scientific eGovernment and public administration contributions in which both

theories have been applied to the field (Lan and Anders, 2000; Llewellyn and Tappin, 2003; Chang et al., 2005; Pablo et al., 2007; Prybutok et al., 2008; Wang and Liao, 2008; Diefenbach, 2009; Chen, 2010). For these reasons, the DeLone and McLean IS success model and the resource-based view are applied as underlying theories.

CONCEPTUALIZATION AND HYPOTHESES GENERATION

Having described the theoretical framework of the study, including identification of the general model parameters of the DeLone and McLean IS success model as well as the theoretical implications of the resource-based view, we now ascertain the determinants or success factors, influencing eGovernment portal success.

Following an extended understanding of the resource-based view, from the perspective of this article the most relevant resources of public institutions are seen as intangible management attitudes and behavioral routines (Eisenhardt and Martin, 2003, p. 341). These are conceptualized as the result of management performance. It is therefore a specific set of intangible input factors that creates a resource in this context. The use of these resources constitutes a success factor among comparable public institutions. The term management is used to describe this resource-based conceptualization of eGovernment portal success factors since most resources in the context of eGovernment portals are complex integrated bundles of attitudes and behavioral routines. This is due to the fact that most tangible resources, like server hardware or office equipment, do not meet the necessary resource conditions of the resource-based view. In this context, management refers to a set of process-related functional resource dimensions and thus, is understood as the refined use of specific resources by chief executives of public administration organizations.

Considering the theoretical framework, we identified four potentially relevant dimensions that represent eGovernment portal management with regards to the study: information management, system management, service management and privacy management. The factor information quality from the DeLone and McLean IS success model is an essential element for the assessment of a website (Welch and Pandey, 2007, p. 386) as well as an important and strong success factor when investigating overall IS success (Petter and McLean, 2009, p. 163). In the context of this study, information management is deduced from information quality and describes the essential characteristics of the information provided in an information system as well as the corresponding resources that contribute to the success of the system (Teo et al., 2008, p. 106). Approaches to conceptualizing information management are provided in the theoretical literature, especially on the DeLone and McLean IS success model. In the context of eGovernment, there exist conceptualization approaches that can be consulted, such as Benbasat et al. (2007), Teo et al. (2008), Prybutok et al. (2008) as well as Verdegem and Verleye (2009). In addition, appropriate approaches can be drawn from the field of eBusiness (Cf. DeLone and McLean, 2004; Wang, 2008).

System quality, which is another key component of the DeLone and McLean IS success model, here referred to as system management, includes all the technological aspects of an information system and the corresponding resources of eGovernment service provid-

ers that have a significant meaning for success. In this context, the use of automated programs to monitor performance and the quality of the systems deserve special mention. In addition, the factor system management also subsumes the fault tolerance of the IT infrastructure and the performance capability of the servers as well as the regularity of inspections of security procedures and systems to assess possible vulnerabilities. The key management task for public administration officials in this domain is to generate awareness for the external implications of these technology-centred aspects regarding public service offerings. In addition to drawing from the criteria of the theoretical basis from the relevant literature on eGovernment, the studies of Teo et al. (2008) and Prybutok et al. (2008) were identified as further starting points for conceptualization. Furthermore, a review of studies in the context of eBusiness was conducted. Here, the study of Ravichandran and Lertwongsatein (2005), which approached the subject from the theoretical perspective of the resource-based view, is of special importance.

Another important domain for the evaluation of public administration resources is service delivery and quality. For this analysis, aspects of the DeLone and McLean model as well as relevant work from service-related marketing research were considered. Thus, service management includes resource-related criteria to ensure the quality of support services as well as IT support tasks. In addition, the factor focuses on public management topics such as the availability of clear guidelines for prioritizing citizen requests, the availability of sophisticated systems for mapping, recording and processing of citizen requests, and also the existence of service level agreements with all user groups within and outside the administration. Setting appropriate standards for IT service quality monitoring is a further component of the factor service management. In addition to the conceptual approaches of eGovernment specific studies, such as those carried out by Zeithaml et al. (2000), Kantsperger and Kunz (2005), Parent et al. (2005), Benbasat et al. (2007), Teo et al. (2008), Prybutok et al. (2008) or Tan et al. (2008), the appropriate marketing literature has been considered as well. In this regard, especially the study by Ravichandran and Lertwongsatein (2005) was examined more closely, as it used the resource-based view as its theoretical basis. Also based on the theoretical framework of the resource-based view was the study of Ray et al. (2005), which examined the subject from a service-related marketing perspective. Both studies provide useful starting points for the conceptualization and operationalization of the relevant success.

In the literature, the importance of data security and privacy for the acceptance of eGovernment is often emphasized (Conklin, 2007, p. 3; Gilbert et al., 2004, p. 293; Sanchez et al., 2003, p. 836). In this context, the aspects of trust in the technology and trust in the institution are of particular importance (Bélanger and Carter, 2008, p. 166). Due to the high relevance of the factor privacy management it is considered a potential determinant of the success of local eGovernment portals along with information management, system management and service management. Regarding the conceptualization of the factor privacy management, the publications of Sanchez et al. (2003); Gilbert et al. (2004); Bélanger and Carter (2008); Teo et al. (2008); and Verdegem and Verleye (2009) are considered appropriate, as they refer to the safety aspects of eGovernment. In addition, in the area of eBusiness the studies of Baker and Wallace (2007), Hong et al.

(2003), Flavián and Guinalíu (2006) and Kritzinger and Smith (2008) are used for the conceptualization of this factor.

Taken together, the following four dimensions information management, system management, service management and privacy management are the indicators representing overall eGovernment portal management. Summing up, we formulate the following four confirmatory-descriptive hypotheses:

Hypothesis 1: Information management is a key dimension of eGovernment portal management

Hypothesis 2: System management is a key dimension of eGovernment portal management

Hypothesis 3: Service management is a key dimension of eGovernment portal management

Hypothesis 4: Privacy management is a key dimension of eGovernment portal management

According to relevant eGovernment literature, conceptual or operational approaches useful to conceptualize eGovernment portal success in terms of management resources are not sufficient. Therefore, we broadened the research perspective and consulted the relevant eBusiness literature. Furthermore, the applicable findings from this research stream where discussed and verified through expert interviews with eGovernment professionals. Based on the outcome of this approach, eGovernment portal success is conceptualized as a construct of eGovernment success resulting in an additional hypothesis that reflects the causal relationship between the eGovernment portal management and the resulting eGovernment portal success. This is expressed in the following confirmatory-explicative hypothesis:

Hypothesis 5: The higher eGovernment portal management, the greater eGovernment portal success

METHODS

These five hypotheses are empirically examined in the following sections. Wherever possible, this study's variables were measured using multiple item measures that have been successfully tested in earlier studies.

Operationalization

The following table shows the key sources used for the operationalization of the derived success factors within this research study. After consulting the suggested criteria for distinguishing formative and reflective indicator models (Jarvis et al., 2003), we gained a clear indication of applying a reflective conceptualization for the constructs.

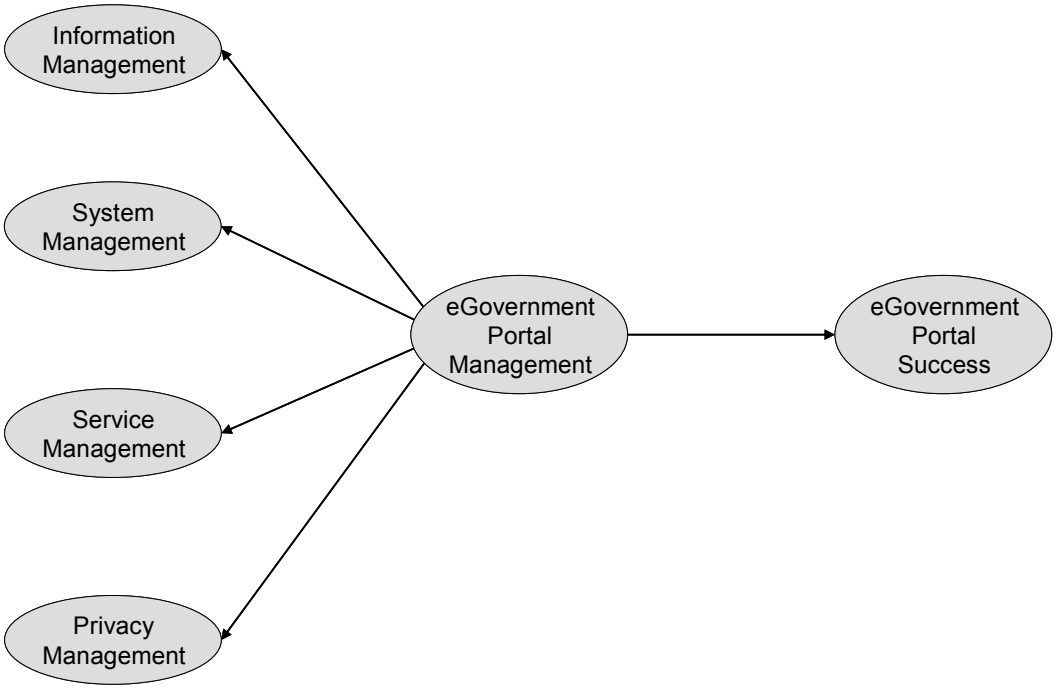
Table 1: Structure and Sources of latent variables

Construct	Structure	Sources
Information Management	9 indicators Reflective indicators Management actions to ensure information quality	Prybutok et al. (2008) Teo et al. (2008)
System Management	8 indicators Reflective indicators Management actions to ensure running systems	Ravichandran and Lertwongsatein (2005) Prybutok et al. (2008)
Service Management	6 indicators Reflective indicators Management actions to assist the user	Ravichandran and Lertwongsatein (2005) Benbasat et al. (2007)
Privacy Management	8 indicators Reflective indicators Management of data security	Suh and Han (2003) Verdegeem and Verleye 2009 Expert interviews
eGovernment Portal Success	5 indicators Reflective indicators Perceptions regarding number of users	Achjari and Quaddus (2004) Expert interviews

Concerning information management, aspects such as timeliness and accuracy or completeness are taken into account. Further relevant performance indicators are reliability and clarity. For a manager of an electronic public service portal these aspects can be primarily controlled by means of knowledge management and citizen feedback. Since most of the studies used a reflective conceptualization of information quality, this supports our decision of adapting this approach for the factor information management. The same holds true for system management, which in accordance with Bharadwaj et al. (1999), Ravichandran and Lertwongsatein (2005), Prybutok et al. (2008) and Khaiata and Zualkernan (2009) are conceptualized reflectively, too. The reflective coverage of the factor service management has also been successfully used by other authors (Parent et al., 2005; Benbasat et al., 2007; Prybutok et al., 2008; Teo et al., 2008; Wang, 2008). Here, especially the measurement approaches of Ravichandran and Lertwongsatein (2005) and Benbasat et al. (2007) provided helpful measurement sources. Concerning privacy management, the level of data protection is measured as a form of resources and the awareness of managerial staff in public administrations regarding the importance of protecting users' personal information. Moreover, management routines that focus on the exclusive authorized use of user information, preventing unauthorized access to personal user data and the ability to delete personal information upon request of users were also included in the operationalization. In addition, technological aspects of citizen interaction are also relevant. These include, in terms of the privacy management factor, resources regarding the safety of interaction, for example by encrypted connections, and, related to this, the confidentiality of citizens' usage behaviour. With respect to operationalization of eGovernment portal success, the conducted expert interviews are

major points of reference. These indicate that the most interesting thing to look at is the number of unique visitors to the city portal in relation to the number of inhabitants in the municipality. Within the relevant eBusiness literature, Achjari and Quaddus (2004) are a reference for researching unique visitors. They developed an item regarding the number of unique visitors visiting a site within their factor Electronic Commerce Success. Another important aspect of the factor eGovernment portal success is the number of visitors that visit the city portal frequently. To complete the operationalization, the derived factors are displayed in the final research model presented in the following figure.

Figure 1: Final Research Model



According to methodical literature, the model and the constructs were - complementary to the literature research - verified in qualitative interviews with 10 public administration experts from the target sample to optimize item verbalization and ensure their comprehensibility (Chang et al., 2011). Regarding privacy management the following item - in addition to the literature results - "Overall, the city portal has a high level of data protection" was added. Concerning eGovernment portal success, the expert interviews finally led to the incorporation of three additional items: "The city portal has many regularly recurring users", "The city portal has many users" and "Overall, the number of users of city portals can be regarded a success". In summary, this approach led to a well-coordinated survey operationalization reflecting theoretical and practical knowledge.

Sample and data

The empirical examination was conducted in Germany through an online survey of eGovernment portal managers of all cities exceeding 10,000 inhabitants. Due to the fed-

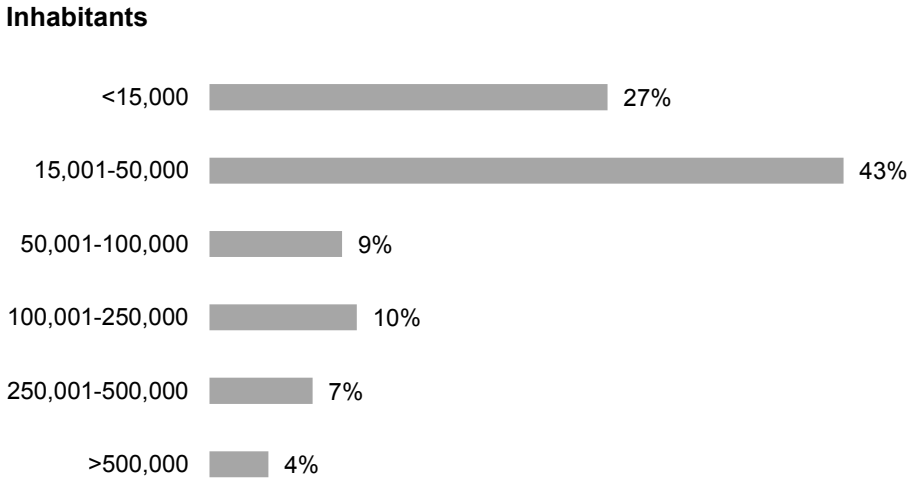
eral structure of Germany and corresponding differences regarding the strategic alignment of eGovernment initiatives, a multitude of disparate electronic public service portal solutions on the local level have emerged (Schuppan, 2009). Therefore, the case of Germany constitutes a very useful example to examine structure and effect of public administration resources in this sector since a high level of variance can be assumed. An online questionnaire was preferred to an oral survey because, above all, it facilitates taking part in the survey and increases response rates (Zikmund et al., 2013; Christensen et al., 2015). To counter any communication problems that might arise from ambiguously phrased indicators and rule out any kind of misunderstanding as far as possible, we applied several tests when designing and conducting the survey. We started with an extensive literature review and expert interviews (Chang et al., 2011) and conducted pretests including think-aloud and item-sorting test as well as a preliminary test-run with selected participants (Anderson and Gerbing, 1991; Johnstone, Bottsford-Miller and Thompson, 2006; Radermacher and Sattelberger, 2010) in November and December 2011.

For this study, the basic population was eGovernment portal chief officers of all cities above 10,000 inhabitants in Germany. Following from this, a database of 1,986 contacts (Statistisches Bundesamt, 2012) could be gathered. Between January and February 2012, we contacted all 1,986 identified contacts via email and asked them to participate in the online survey. Overall, we collected 246 responses, from which 227 responses could be included in the analysis. This equals a response rate of 12.4%.

After an initial data screening, we checked for non- or late-response bias, which indicates that there may be differences between respondents and non-respondents (Ruxton, 2006; Fuller, 2009, p. 281; Zikmund et al., 2013, p. 220), comparing early- and late-respondents (Fuller, 2009, p. 281; Johnson and Wislar, 2012). Non-response bias was not found in the sample since late responses did not vary significantly from early ones. Thus, non-response bias does not seem to be an issue (Armstrong and Overton, 1977). However, non-response bias cannot be rejected completely because reasons for answering late may vary from reasons for not answering a survey at all (Flint and Mentzer, 1997). Apart from that, we tested for the presence of common method bias. Therefore, Harman's one-factor test, which tests if the majority of the variance can be explained by a single factor, was conducted (Harman, 1976). A common method effect was not found.

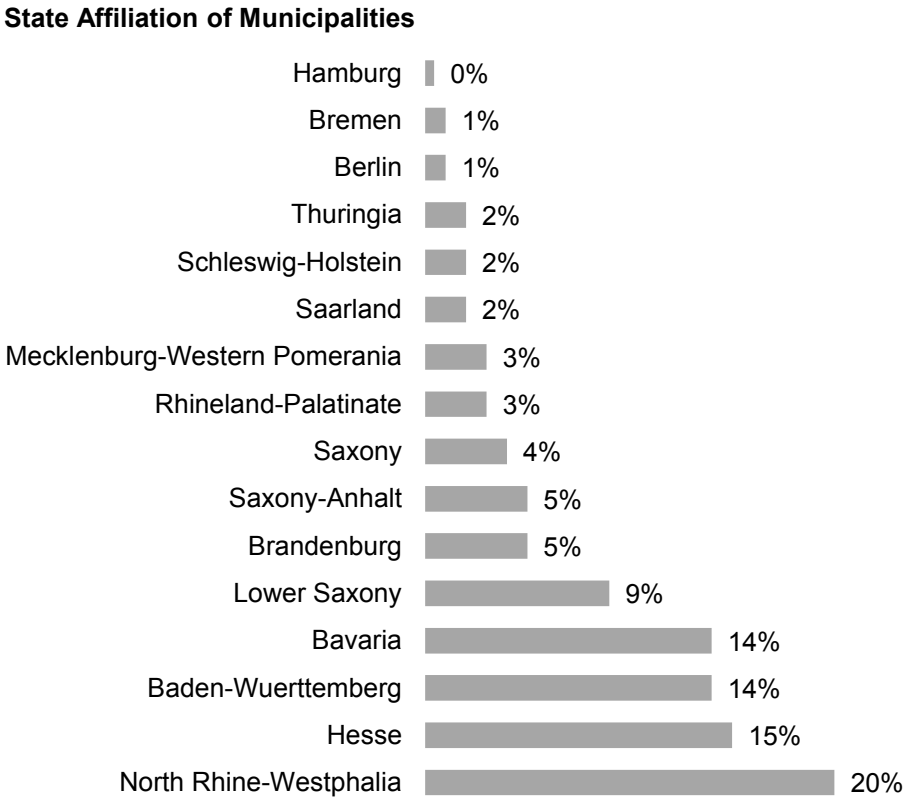
In general, the majority of responses come from medium sized municipalities. Approximately 80% of the responses come from cities being smaller than 100,000 inhabitants. Since roughly 70% of the population in Germany lives in cities smaller than 100,000 inhabitants (Cf. Statistisches Bundesamt, 2012), we are satisfied with this figure.

Figure 2: Descriptive Variables of the Sample (Size)



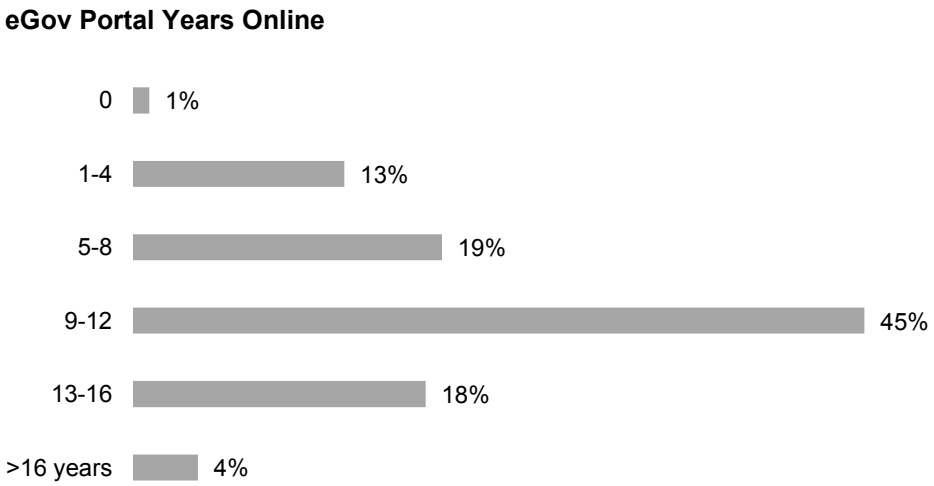
In terms of state affiliation a balanced sample, with the exception of Hamburg as a single-municipality state and a higher response rate from municipalities in the Southern and Western states, could be reached.

Figure 3: Descriptive Variables of the Sample (State)



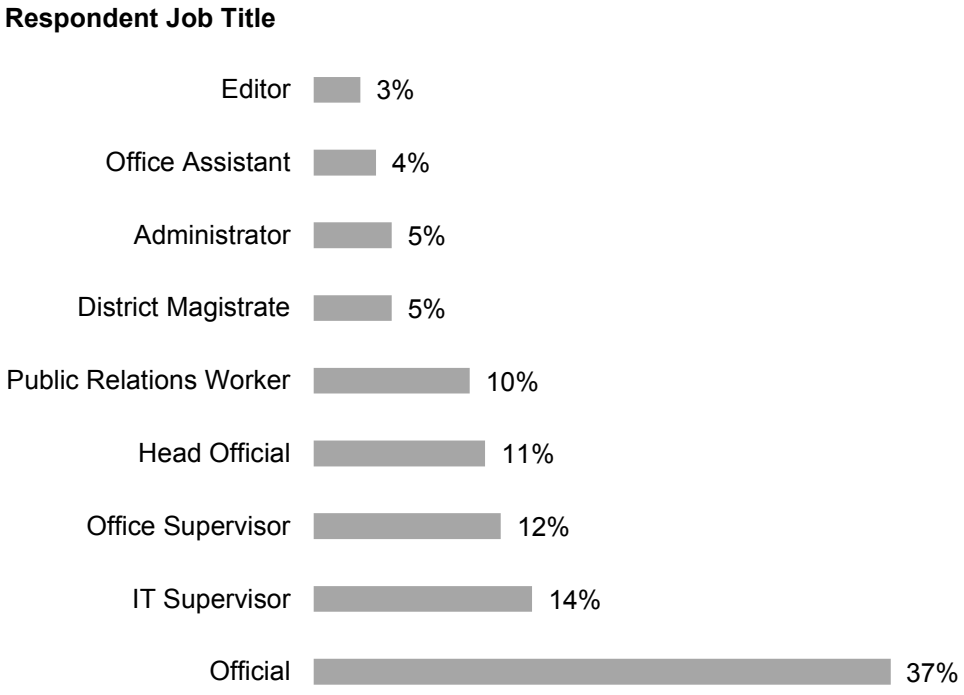
For comparative reasons of the portals, the number of years the corresponding eGovernment portal has been online was collected. 82% of the respective eGovernment portals have been in place between 5 and 16 years, indicating the largest single group of around 10 years with roughly 45% of the sample.

Figure 4: Descriptive Variables of the Sample (Years Online)



Furthermore, the job title of the responding public management officials were collected and analysed for the sample.

Figure 5: Descriptive Variables of the Sample (Job Title)



Since we did not locate significant descriptive irregularities in the data and the responses seem well balanced, a statistical analysis of the sample is regarded viable.

Method of examination and test criteria

For the present analysis, covariance structure analysis was chosen, as it particularly suits the research of latent variables and is of a strong hypotheses-testing nature. Hair et al. (2010) argue that models up to seven constructs require a minimum sample size of 150. Chin and Newsted (1999) generally demand a sample larger than 200 if one is to obtain statistically robust results (Chin and Newsted, 1999, p. 336). As both requirements are fulfilled for the present study, we decided to apply a covariance structure analysis. Overall, the statistical tool AMOS 18.0 was used for the empirical analysis of the research model.

In order to assess the quality of an operationalization, a large number of criteria have been established in the literature. In this context, a distinction can be made between criteria of the first and the second generation. Among the criteria of the first generation are Cronbach's alpha, the item-to-total correlation and the exploratory factor analysis, all of which are considered within this research study. The criteria of the second generation comprise indicator reliability, factor reliability and average variance extracted as well as chi-squared value, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative-fit index (CFI), Tucker-Lewis index (TLI) and root-mean-squared-error-of-

approximation (RMSEA) (Hair et al., 2010, p. 664; Hu and Bentler, 1999, p. 27; Kline, 2011, p. 199). All of these are used in the following empirical analysis of the research model. Furthermore, the common values for the criteria of good quality measurement are employed in this study and validity and reliability are examined in a multi-level process (Hair et al., 2010, p. 654).

EMPIRICAL RESULTS

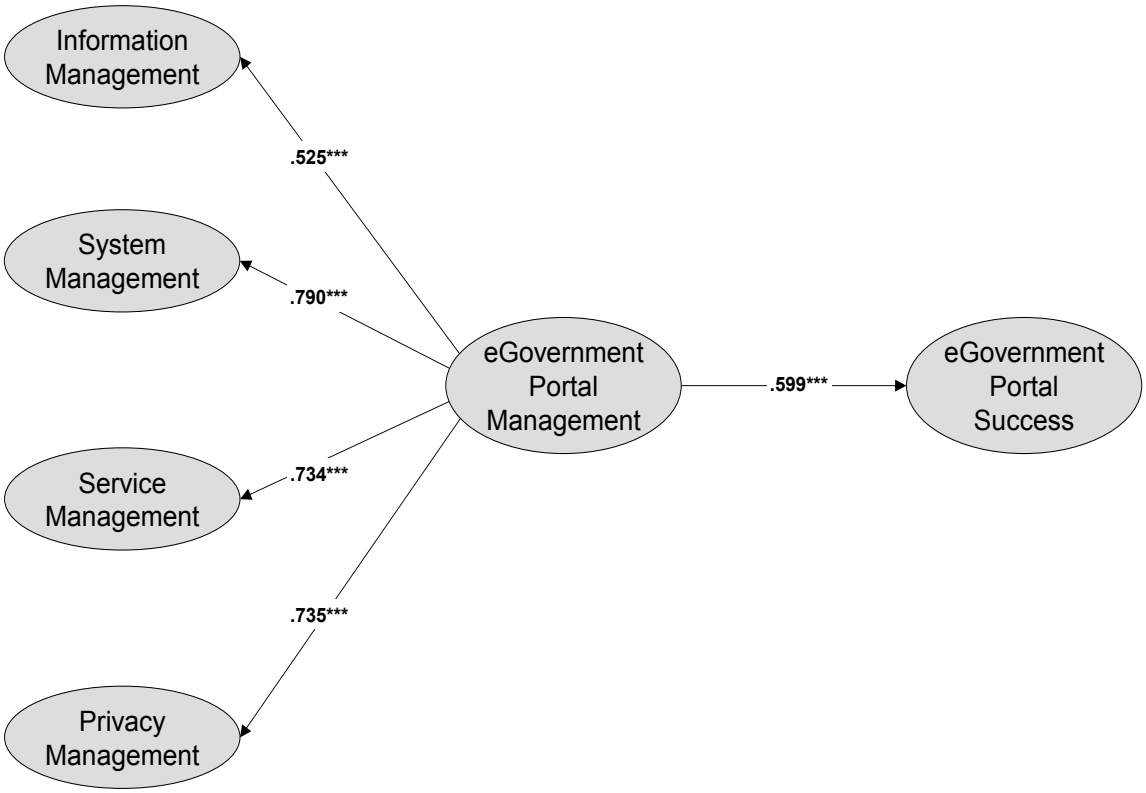
The analysis of the individual measurement models shows that the used indicators are highly reliable and valid. This was tested by conducting an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA). The EFA revealed that all indicators of one measure load only on one factor and explain at least 50 % of the variance. Moreover, the standard value of the Kaiser-Meyer-Olkin (KMO) criterion is met for all factors. The same is true for Cronbach's alpha. With the help of the CFA the factor structure and convergence validity are successfully confirmed. Moreover, each construct shows confirmatory factor reliability as well as average variance extracted clearly above the suggested minimum values of 0.6 and 0.5 (Bagozzi and Yi 1988) respectively (for further details please see measurement model tables in the appendix). Following the verification of the measurement models, discriminant validity was tested with the Fornell-Larcker criterion, which states that if the average variance extracted of a construct is higher than any squared correlation with another construct then it may be assumed that discriminant validity is met (Fornell and Larcker, 1981). As shown in the following figure, this quality measure is met for all factors.

Figure 6: Fornell-Larcker-Criterion

	1	2	3	4	5
Information Management (1)	**0.662**				
System Management (2)	0.155	**0.540**			
Service Management (3)	0.123	0.353	**0.570**		
Privacy Management (4)	0.127	0.387	0.274	**0.632**	
eGovernment Portal Success (5)	0.190	0.162	0.221	0.221	**0.796**

With established validity, the entire model is examined in the next step. Figure 7 presents the results of the causal-analytical examination of the dimensions of eGovernment portal management and the resulting eGovernment portal success in the cases examined.

Figure 7: Empirical Examination of the Research Model



CMIN/df = 1.916	GFI (HAT) = 0.960	TLI = 0.930	Significance level:
CFI = 0.937	AGFI (HAT) = 0.952	RMSEA = 0.064	* α ≤ 0.10; ** α ≤ 0.05; *** α ≤ 0.01

The empirical results suggest that the theoretical model accurately captures the pattern of the relationships found in the data. On the whole, the empirical model shows a good fit. With a value of 0.930 of the TLI and a value of 0.937 of the CFI, both criteria are above the minimum requirements of ≥ 0.9. The same can be stated for the CMIN/df, which with a value of 1.916 is way under the minimum requirements of ≤ 5 and can be considered as a good indicator for the overall model fit. It needs to be emphasized that, as in the paper of Steiger (1990), for this study the GFI-HAT and the AGFI-HAT is used, as the GFI and AGFI tend to be overestimated in complex models. The value of the AGFI-HAT is 0.952 and thus, above the minimum requirements of ≥ 0.85. The value of the GFI-HAT shows good quality with 0.960 clearly exceeding the minimum requirement of 0.9. The RMSEA - being important in complex models - shows a particularly good value (0.064) and is well below the maximum limit of 0.08. Consistent with the proposed hypotheses, eGovernment portal management consists of the four theoretical derived dimensions and has a substantial direct effect on the resulting eGovernment portal success. The following will elaborate on the dimensions of eGovernment Portal Management before presenting the results of the structural relationship between the factors eGovernment Portal Management and eGovernment portal success.

The results reveal that all four dimensions are highly significant for the factor eGovernment portal management. In this regard, the factor system management, with a value

of 0.790, has to be highlighted, as it is the dimension that is most important for eGovernment portal management. Furthermore, the dimensions service management and privacy management need to be emphasized, as they have high and similar values of 0.734 and 0.735 and, therefore, are relevant dimensions for eGovernment portal management as well. Information management with 0.525 shows the smallest path coefficient but nevertheless is still highly significant. All in all, hypotheses 1, 2, 3, and 4 cannot be rejected.

Furthermore, the empirical study of the path relationship between eGovernment portal management and eGovernment portal success reveals that hypothesis 5 cannot be rejected either. The highly significant path coefficient of 0.599 from eGovernment portal management to eGovernment portal success indicates a clear effect on eGovernment portal success.

DISCUSSION OF FINDINGS, IMPLICATIONS AND LIMITATIONS

This study constitutes a theory-driven contribution to the empirical identification and measurement of the success factors behind eGovernment portals from a provider-perspective since we developed a specific eGovernment portal success model based on the DeLone and McLean IS success model and the resource-based view. Especially the combination of the four portal management related constructs, information management, system management, service management and privacy management, allows a meaningful modelling approach. These four dimensions highly significantly manifest eGovernment portal management, which again builds a highly significant relationship to eGovernment portal success. Thus, all constructs could be empirically confirmed, which enhances the understanding of relevant factors of eGovernment portal management and success.

According to a broad common understanding in the scientific literature, our information management findings also indicate the importance of relevant information to build up or maintain a successful eGovernment portal (Cf. DeLone and McLean, 1992; Wu and Chen, 2005; Bertot et al., 2008; Jaeger and Bertot, 2010). The lower coefficient may be due to the situation that information management is not a key work task of providers of the portal but is instead mainly a task for the public relations or communications department of the city. System management, which according to the DeLone and McLean IS success model is another key success component (Cf. DeLone and McLean 1992; 2004), has been confirmed to possess a significant meaning for success in the context of our study as well. Service management shows high coefficient paths to eGovernment portal management. Here, we assume that this may be related to effective user support and effective data protection on the administration portal. Privacy management shows - in accordance with our previous findings from the literature review - highly significant coefficient paths and thus, indicates considerable importance of data and privacy security (Conklin, 2007; Gilbert et al., 2004; Sanchez et al., 2003) as well as trust in the technology and trust in the institution (Bélanger and Carter, 2008). Therefore, privacy is a crucial factor that needs to be maintained and continually observed (Cf. Cavoukian 2010; van Lieshout et al. 2011). Moreover, public administration officers should take

care that adequate guidelines are in place and communicated to the relevant citizens to create awareness of security and privacy (Cf. Xu et al. 2008). Apart from these contextual findings, the measurement scales employed proved to be valid and reliable and are therefore suitable for future analyses in the field of success factor research in public administration.

The obtained results indicate manifold public managerial implications. Regarding practical information management, the public officer in charge needs to ensure that the portal is up-to-date and shows clear, precise and reliable user-oriented information. Thus, in-house control over the website, a sound website governance and leadership structures to incorporate end-user relevant information need to be ensured (Cf. Gil-Garcia, 2006; Detlor et al., 2010). From a system management perspective the provider has to take care to have automated performance monitoring applications and clear contingency plans in place. Moreover, awareness and a common understanding of the potential implications of portal down-time due to system crashes and failure should be present throughout the group of responsible officers dealing with the eGovernment portal (Cf. Prybutok et al., 2008; Lee, 2010; Lin et al., 2011). For service management, well-defined service-level-agreements with the respective parties, clear guidelines, specialized training of responsible officers as well as back-office processes to efficiently handle user service requests are of vital importance (Cf. Gil-Garcia, 2006; Bertot et al., 2008; Prybutok et al., 2008; Detlor et al., 2010; Lee, 2010). Since privacy is a crucial factor (Cf. Cavoukian 2010; van Lieshout et al. 2011), public administration officers should also take care that adequate security guidelines are in place and communicated to the relevant citizens to create privacy awareness (Cf. Xu et al. 2008).

Furthermore, we derived practical implications that explicitly address the area of responsibility of eGovernment portal administrators. On the one hand, the integrated nature of the portal management process needs to be considered when planning and implementing eGovernment portals since a one-sided approach may reduce the overall success. Thus, awareness of all relevant management dimensions needs to be strengthened among administrative staff. On the other hand, the results highlight the importance of specialized trainings for employees that manage eGovernment portals in order to ensure that they possess sufficient knowledge of all relevant task dimensions (Gil-Garcia, 2006; Detlor et al., 2010). In this context, specifically processes that are not technical, like the provision of support services, need high attention. Furthermore, there needs to be an adequate pool of technical resources to support the setup as well as service and maintenance of stable systems (Cf. Gil-Garcia, 2006; Detlor et al., 2010) since unavailable tools limit the exploitation potential of eGovernment portals.

Irrespective of the theoretical and practical contributions, the results also have their limitations. Since this study refers to a particular period and hence represents the range of opinion within only a short time frame, it would be of interest to carry out a longitudinal study and to compare those results with the present results. Moreover, this study has been conducted on a national level in a single country. Thus, it would be interesting to approach the research object from a cross-national perspective as well. In addition, the integration of leadership based constructs (Prybutok et al., 2008) as possible determinants could be fruitful. Also user acceptance-based concepts like perceived risk could

be adapted to the provider-perspective of eGovernment portals. A direct comparison between the user- and provider-perspective using a multi-level methodology may be another important research objective.

CONCLUSION

The results of this study highlight the relevance of eGovernment portal management aspects of public administrations at the local level. Given the professionalism of the key informants and their high degree of experience with eGovernment portals an important perspective has been added to this research stream of public administration. With the Delone and McLean IS success model an established framework of information system research was successfully transferred to a provider-perspective. This transfer increases the content validity of the measures. Furthermore, several conclusions relevant to providers of local eGovernment portals can be drawn from the analysis. First, the four dimensions information management, system management, service management and privacy management of eGovernment portal management are important to consider when improving existing eGovernment portals, incorporating new functions or establishing a new system. Second, the process of managing an eGovernment portal proves to be highly integrated. However, from an operator perspective system management is a key contributor to the success of the local portal and therefore, deserves special attention. Third, provided information needs to be clear, precise, up-to-date, reliable and user-oriented. Forth, a technical and resource environment to reduce portal down-time as much as possible should be in place. This also refers to suitable service-level-agreements and clear guidelines and back-office processes to efficiently handle user service requests. Last, privacy is of vital importance and needs to be maintained by all means.

Apart from the public management benefits, the study also contributes to the advancement of the scientific discourse since additional insight into success factor research could be achieved and the empirical scientific basis of the field of sustainability and quality enhancement within public administration could be improved. Moreover, the results complement the findings of user-based studies and broaden the field of eGovernment research. Despite the limitations of this study, scientific and practical implications for public administration could be derived and suggestions for further research are provided.

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